

To: Digiulio, Dominic[Digiulio.Dominic@epa.gov]
From: NOUYRIGAT, Vincent
Sent: Tue 2/26/2013 5:48:08 PM
Subject: questions about hydraulic fracking contamination, French science magazine

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Science journalist

Magazine : Science & Vie

Paris, France

Dear professor di Giulio,

I contact you because we are writing a large cover story about shale gas in France. . And I would like to ask you 4-5 questions related to hydraulic fracking potential contaminations, and research at EPA [my dead-line before writing is around 12th march] :

-Is the case of Pavillion contamination very specific because of its geology (gas source very shallow, if I understand correctly?) or could it be extrapolated to other cases ? Do you know if the source of the contamination is the failure of a casing ?

-Could fracking enhance migration of gas or other contaminants (may be massive migration) from very much deeper formation (specially in areas where there is lot of discontinuities, and faults)? Is it excluded at time scale of months or years ?

-Apart Pavillion case, is there any other quite proved case of contamination (from methane to water additives or water flowback contaminated by radioactive or heavy metals) ?

-Among the various additives that are used nowadays by industry :are some of them dangerous even with their high dilution by the thousands m3 of water injected –I don't know if dilution is enough for products like arsenic ?

--Flowback water that have leached shale, could transport radioactive contamination (Marcellus, for example) or may be heavy metals : petroleum industry is accustomed to these sort of contaminated fluids ? How treat it with these with very high output (UV?)?

-And last question : In france, the basin for interest for shale gas has a lot of karst formations from 0 to 300 m deep or something like that : does this situation pose a particular problem –not only from very high speed of water circulation (and not very well known), but also about the solidity of casing and cementing ? In USA, are there shale gas that are extracted under karst or other complex hydrogeologic situation ?

Many thanks for your answers,

Best regards,

Vincent